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Beaujouan, Eva; Berghammer, Caroline

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The Gap Between Lifetime Fertility Intentions and Completed Fertility in Europe and the United States: A Cohort Approach

Eva Beaujouan[1] · **Caroline Berghammer**[2,3]

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Abstract
We study the aggregate gap between intended and actual fertility in 19 European countries and the US based on a cohort approach. This complements prior research that had mainly used a period approach. We compare the mean intended number of children among young women aged 20 to 24 (born in the early 1970s), measured during the 1990s in the Fertility and Family Surveys, with data on completed fertility in the same cohorts around age 40. In a similar manner, we compare the share who state that they do not want a child with actual cohort childlessness. Our exploration is informed by the cognitive–social model of fertility intentions developed by Bachrach and Morgan (Popul Dev Rev 39(3):459–485, 2013). In all countries, women eventually had, on average, fewer children than the earlier expectations in their birth cohort, and more often than intended, they remained childless. The results reveal distinct regional patterns, which are most apparent for childlessness. The gap between intended and actual childlessness is widest in the Southern European and the German-speaking countries and smallest in the Central and Eastern European countries. Additionally, we analyze the aggregate intentions-fertility gap among women with different levels of education. The gap is largest among highly educated women in most countries studied and the educational gradient varies by region, most distinctively for childlessness. Differences between countries suggest that contextual factors—norms about parenthood, work–family policies, unemployment—shape women's fertility goals, total family size, and the gap between them.

Keywords Childlessness · Education · Europe · Family size · Fertility intentions · United States

✉ Eva Beaujouan
eva.beaujouan@wu.ac.at

Extended author information available on the last page of the article

Introduction

While fertility rates are generally low in Europe, fertility intentions remain close to replacement level. In 2011, across the 27 countries of the European Union, women in young adulthood (age 15 to 24) intended to have, on average, 2.1 children (Testa 2012). This suggests that couples frequently have fewer children than they intended to have, resulting in an aggregate gap between intentions and behavior (see e.g., Harknett and Hartnett 2014). This notion of a "fertility gap" has been picked up by policy makers who have, as a consequence, formulated the aim to enable couples to have the number of children they intend to have (Philipov 2009). It entered policy debates and official policy documents of the European Commission in the 1990s and 2000s, and became one of the main justifications for family policies. In the scholarly literature, the "fertility gap" is typically measured by comparing stated lifetime family size ideals or intentions with period indicators of fertility in the recent past, such as the total fertility rate (Adserà 2006; Bongaarts 2008; Lutz 2007; Sobotka and Lutz 2010; Testa 2012). These comparisons do not, however, reflect early lifetime intentions and total family size of one and the same birth cohort of women and, as a result, the messages arising from them can be misleading (Sobotka and Lutz 2010).

Our current study adds to the research on the fertility gap by analyzing the gap between aggregate fertility intentions in early adulthood and ultimate completed fertility within a birth cohort of women. Recommended by Sobotka and Lutz (2010), the cohort approach is internally more consistent and methodologically more rigorous than approaches taken by most previous studies, which compare lifetime and period measures. Moreover, our study is the first to systematically measure the gap across many countries along cohort lines. Single country studies have provided detailed analyses, but their results cannot be directly compared because they considered different cohorts, measured fertility intentions at different ages, and relied on different intention measures (Berrington and Pattaro 2014; Morgan and Rackin 2010; Smallwood and Jefferies 2003). Our paper takes another step forward with respect to these earlier works by applying a uniform research design for studying a large number of countries.

In this study, we specifically estimate two gaps for women born (mainly) in the early 1970s for 19 European countries and the US. First, we estimate the difference between mean intended family size in young adulthood (age 20 to 24) and cohort total fertility rate; the "fertility gap" obtained is the mean number of children the cohort falls short of. Second, the equivalent difference between intended and eventual cohort childlessness is denoted as "excess childlessness."[1] We also analyze the gaps by education for a subset of 11 countries in order to explore which groups in society under-achieve their fertility intentions from an aggregate perspective (Berrington and Pattaro 2014). For the education-specific analyses, we study fertility

[1] We use the term "childlessness" because it is well-established in the research literature. It has been critically discussed because its meaning ("without a child") implies a norm of having children. The alternative "childfree" implies a choice, which is not always the case, so we opted for the usual wording.

intentions of 25- to 29-year-old women, because most of them have completed their education by this age.

The framework of our study relies on the cognitive–social model of fertility intentions developed by Bachrach and Morgan (2013), which addresses the predictive value of intentions reported early in life for fertility at the (cohort) aggregate level. It is also informed by Bongaarts' (2001) investigation of the factors possibly enhancing and reducing the period fertility gap. The cognitive–social model of fertility intentions posits that the lifetime fertility intentions reported during young adulthood tend to be more influenced by cultural models and schemas of the family that are established during childhood and adolescence—which involve little commitment to act—than by specific experiences and actual circumstances (Bachrach and Morgan 2013). This contrasts with short-term intentions, which take into account the specific life circumstances (Billari et al. 2009; Dommermuth et al. 2011; Iacovou and Tavares 2011; Spéder and Kapitány 2009; Testa 2014; Testa et al. 2014). Despite a high degree of uncertainty and low individual predictive validity (Ní Bhrolcháin and Beaujouan 2011), aggregate lifetime intentions are on average better predictors of fertility than individual-level intentions, because over- and under-achievement tend to balance each other out, as research on the US has shown (Edmonston et al. 2010; Morgan and Rackin 2010). As to fertility outcomes, the cognitive–social model posits that they are predominantly influenced by the institutional and cultural context, fertility intentions themselves, as well as by competing factors in other life domains, most importantly education, employment, relationships, and leisure (Bachrach and Morgan 2013; Bongaarts 2001). Our cross-national approach allows us to discuss the importance of structural and cultural conditions on the country level in shaping fertility intentions, actual fertility, and the gap between them.

The Gap Between Lifetime Intentions and Final Parity

Conceptual Framework

When examining the cohort fertility gap, lifetime intentions and actual fertility need to be studied and understood independently because they are influenced by different processes and determinants. According to Bachrach and Morgan's cognitive–social model of fertility intentions (2013), during childhood in the family of origin, persons develop schemas—such as the concept of a family—which get connected with sensations and feelings. In adolescence, these schemas are then related to the perception of oneself and oneself-to-be. When children relate to positive feelings, the formation of positive fertility intentions later in life becomes more likely. Intentions are commonly conceived as behavioral goals corresponding to specific circumstances and involving a clear commitment to act. As Miller has stated, "intentions involve a specific decision to pursue an actionable goal, with an associated commitment and, commonly, a plan for implementing the decision" (Miller 2011, p. 78). Lifetime intentions reported by young adults, by contrast, are often uncertain, tentative, and volatile (Iacovou and Tavares 2011). This uncertainty is reinforced because the common preconditions for having a child—having a steady partner,

completing education, acquiring a stable job, and accumulating resources such as income or housing—are often not fulfilled (Ní Bhrolcháin and Beaujouan 2011). This has implications for the interpretation of young adults' intentions stated in surveys. Bachrach and Morgan have argued that: "In some cases, the answers may reflect intentions; in other cases, they may reflect scripts or cultural models imbued with positive affect and integrated into self-schemas […]; in yet others, answers may simply reflect basic prototypes of a family—a mother, father, and two children, for example—perhaps associated with positive affect but not deeply integrated into a schema of a future self" (Bachrach and Morgan 2013, p. 470). The authors call these answers 'reported intentions' in contrast to 'actual intentions.' This distinction is important for interpreting the lifetime fertility intentions and the resulting gap to total number of children. Smallwood and Jefferies have posited that the fertility gap "should not necessarily be interpreted as an unmet need for fertility. The disparity is as likely to be a result of the uncertain nature of many women's intentions and the tendency of intentions to be modified according to circumstances" (Smallwood and Jefferies 2003, p. 24). When they address the relationship between fertility intentions and behavior at the aggregate level, Bachrach and Morgan (2013) shift their focus from cognitive processes to structural conditions based on Bongaarts' model (2001). They argue that "[b]ecause fertility intentions may be rooted in deeply valued, long-standing schemas about the family, whereas their implementation necessarily depends on contemporary structural conditions, there is much room for aggregate-level intentions and fertility to diverge during a cohort's reproductive years" (p. 479). The degree to which they diverge varies across countries and is dependent on the mix of the different factors proposed by Bongaarts in the period perspective. The factors that reduce fertility are competing goals (with regard to education, employment, and leisure), adverse circumstances (such as unemployment), infecundity, and fertility postponement. On the other hand, fertility will be enhanced by unwanted births (dependent on contraception and abortion), replacement of deceased children, and sex preferences. In contemporary developed societies, we consider that infecundity as well as sex preferences and replacement of deceased children will act at about the same level in all countries, which allows to disregard them in our comparison. Given our cohort approach, we also disregard fertility postponement, which Bongaarts discusses in view of distortions in the total fertility rate. In our comparative cohort framework, competing goals and adverse circumstances thus remain the main factors potentially reducing fertility, and unwanted births enhancing it.

Previous Empirical Studies

Empirical evidence on the cohort fertility gap is rather limited. The predictive value of aggregate intentions reported early on in adult life for final parity has been investigated in single country studies for the US (Freedman et al. 1980; Morgan and Rackin 2010), the UK (Berrington and Pattaro 2014; Smallwood and Jefferies 2003) and Norway (Noack and Ostby 2002). Those studies have found a gap of around 0.2–0.3 children per woman between intended and actual numbers of children for cohorts born in the mid-1950s to the early 1960s. In the US, the gap between

intentions at age 24 and completed fertility amounted to 0.25 births per woman (difference between 2.22 and 1.97; birth cohorts 1957–1964) (Morgan and Rackin 2010).[2] In the UK, a gap of 0.2–0.3 births per woman was reported between stated intentions at ages 21 to 23 and final parity (mean intended family size of 2.25; birth cohorts 1957–1959) (Smallwood and Jefferies 2003). In Norway, women aged 20 to 24 (cohorts 1953–1957) intended to have on average 2.4 children but had reached 2.1 children by their 40s (Noack and Ostby 2002).

Relating period to cohort measures, Sobotka and Lutz (2010) have provided evidence on the size of the fertility gap based on the intended number of children and the tempo-adjusted total fertility rate for different regions of Europe. They showed an average gap of 0.34 children per woman for EU-27 with the minimum gap observed in Germany and Austria (0.25) and the maximum gaps in Central and Eastern European countries (0.44) and Northern Europe (0.41). They found moderate gaps for Western and Southern Europe.

A small number of studies also investigated how lifetime intentions and their realization differed by educational attainment; they reported that the gap grows with education (e.g., Berrington and Pattaro 2014). Indeed, even though there is no consistent link between intentions articulated in early adulthood and educational level (Berrington and Pattaro 2014; Sobotka 2009; Testa 2014), highly educated women tend to reach a smaller completed family size than their lower educated counterparts with variations by welfare regime (Merz and Liefbroer 2017; Neyer and Hoem 2008). In the US, the overachievement (i.e., having more children than intended) of women with a lower level of education was partly attributed to unintended childbearing (Morgan and Rackin 2010; Quesnel-Vallée and Morgan 2003).

Country-Specific Expectations

The comparative design of our study allows us to explore why the fertility gap varies across countries. Based on our conceptual framework, with respect to fertility intentions, we focus on the size of the family of origin to refer to cultural norms and norms within families. With respect to the actual number of children, we focus on employment conditions and work–family compatibility[3] (to represent unanticipated circumstances and competing goals) as well as on contraceptive use and abortion (as correlates of unplanned births) (see Table 1).

[2] An earlier study on the US showed that the gap was 1.0 child for women who were first interviewed in 1962 in early adulthood (difference between 3.67 and 2.67 children) (Freedman et al. 1980).

[3] In the frame of this paper, we do not consider leisure, studies, and relationships, although they are structural elements that influence the actual number of children (Bachrach and Morgan 2013). We assume that the chance of entering a partnership is similar across the countries under study. Separation rates differ by country, which may affect completed fertility because women who separate have, on average, less children than the others (Van Bavel et al. 2012). At least, among women the effect of separation on completed fertility itself varies very little by country. Leisure and studies are relevant as competing goals, but arguably less so than employment and we assume few systematic differences between countries.

Table 1 Country characteristics

	Completed cohort fertility (1)			Total unemployment rate, age 25–49 (2)		Employment rate of mothers age 25–44 with children < 15 years (3)		Childcare participation rate < 3 years (4)	Average number of weekly hours in childcare < 3 years (5)	Use of reliable contraception, age 25–34 (6)	Rates of legally induced abortion, age 15–44 (7)	% Strongly disapprove if a woman chooses never to have children, age 15+ (8)
	1950–1954	1965–1969	Difference	1995–1999	2000–2004	1995–1999	2000–2004	2004 or 2005	2005	1990–1999	1995	2006
Age of study population				20–29	25–34	20–29	25–34	30–34	30–34	15–29	20–24	30–34
Western and Northern Europe												
Belgium	1.82	1.82	0.00	8	7	66	67	40	28	64	6	4
France	2.12	2.02	− 0.10	11	8	65	65	42	27	67	12	11
The Netherlands	1.88	1.77	− 0.11	5	3	68	67	43	16	–	6	4
Norway	2.07	2.08	0.01	3	3	75	75	33	31	53	15	1
UK	2.05	1.91	− 0.14	6	4	66	63	37	17	–	14	1
US	2.03	2.13	0.10	4	4	67	68	27	–	–	–	–
German-speaking countries												
Austria	1.82	1.63	− 0.19	5	4	67	64	11	16	58	–	11
Germany	1.69	1.51	− 0.18	8	8	63	57	14	25	61	8	5
Switzerland	1.77	1.66	− 0.11	4	3	73	76	35	16	70	8	4
Southern Europe												
Greece	2.01	1.75	− 0.26	9	10	53	53	12	32	36	–	–
Italy	1.85	1.50	− 0.35	10	8	48	48	27	30	41	11	–
Portugal	2.04	1.78	− 0.26	5	5	73	76	38	38	n.a.	–	5
Spain	2.08	1.57	− 0.51	18	11	44	49	43	24	66	6	5

Table 1 (continued)

	Completed cohort fertility (1)			Total unemployment rate, age 25–49 (2)		Employment rate of mothers age 25–44 with children < 15 years (3)		Childcare participation rate < 3 years (4)	Average number of weekly hours in childcare < 3 years (5)	Use of reliable contraception, age 25–34 (6)	Rates of legally induced abortion, age 15–44 (7)	% Strongly disapprove if a woman chooses never to have children, age 15+ (8)
	1950–1954	1965–1969	Difference	1995–1999	2000–2004	1995–1999	2000–2004	2004 or 2005	2005	1990–1999	1995	2006
Central and Eastern Europe												
Bulgaria	2.05	1.71	− 0.34	–	15	–	63	9	40	30	50	67
Czech Republic	2.10	1.92	− 0.18	6	7	67	60	3	11	55	21	–
Estonia	1.97	1.87	− 0.10	11	10	70	66	15	34	65	56	24
Hungary	1.95	1.94	− 0.01	8	6	62	57	8	31	69	35	21
Latvia	1.86	1.82	− 0.04	13	12	71	72	18	39	51	47	–
Lithuania	1.97	1.81	− 0.16	13	13	72	73	17	38	38	38	–
Slovenia	1.90	1.79	− 0.11	6	5	82	81	27	37	60	23	8

Sources (1) 1950–1954: Human Fertility Database [except for BE, ES, GR, IT, LV, NO, PL, SI, UK (UK: 1951–1954): data provided by Tomáš Sobotka]; 1965–1969: data provided by Tomáš Sobotka [except for EE (1965–1968): HFD]; US from the European Demographic datasheet 2010 (birth cohort 1968) and the European Fertility datasheet 2015 (birth cohort 1950). (2) Eurostat Database: unemployment rates by sex, age and nationality (lfsa_urgan). Country deviations: 1996–1999 (CH, HU, SI), 1997–1999 (CZ, EE, PL), 1998–1999 (LT, LV). US: unemployment rate 25 years and over (Labor Force Statistics from the Current Population Survey; United States Department of Labor). (3) Own computations based on the EU Labour Force Surveys. Mothers on maternity leave or parental leave are coded as inactive. Country deviations: 1996–1999 (CH, HU, SI), 1997–1999 (CZ, EE, PL), 1998–1999 (LT, LV). US: employment status of women by the presence and age of youngest child, March 1975–2007 (Labor Force Statistics from the Current Population Survey; United States Department of Labor); refers to women with own children below age 18. (4) OECD Family Database: enrolment in childcare and pre-school (PF3.2). Country deviations: 2006 (DE, US), 2007 (BG), 2009 (CH). (5) Eurostat Database: average number of weekly hours of formal care by age group (ilc_camnforg0). Country deviations: 2006 (BG), 2009 (CH). (6) Own computations based on the weighted Fertility and Family Surveys 1990–1999. Question (asked among those who have had a sexual intercourse in the last 4 weeks): "Which contraceptive method or combination of contraceptive methods have you and/or your partner used in the last 4 weeks?" Sterilization, pill, intrauterine, injection, diaphragm, and condom were classified as reliable contraception. (7) Henshaw et al. (1999). Data may be incomplete (underestimated) for Spain, France, Italy, and Lithuania; year 1996 in Switzerland and Germany; UK refers to England and Wales. (8) Own computations based on the weighted European Social Survey 2006. Question: "How much do you approve or disapprove if a woman chooses never to have children? Strongly disapprove, disapprove, neither approve nor disapprove, approve, strongly approve"

A dash indicates that no data is available

The fertility rate of earlier cohorts may be taken as a proxy for prevailing cultural childbearing norms during childhood and adolescence. We thus use the fertility level of cohorts born in 1950–1954, i.e., around 15 years earlier, to represent family structure while growing up. Where previous cohorts had higher numbers of children, cultural norms of large families prevail (Testa and Grilli 2006), and if people experienced growing up with many siblings, their fertility intentions tend to be higher too (Axinn et al. 1994; Kotte and Ludwig 2011; Régnier-Loilier 2006). Therefore, in countries with a strong decline of fertility over cohorts, a marked gap between reported intentions and behavior is likely to arise. The fertility decline was most pronounced in the Southern European countries (Greece, Spain, Italy, and Portugal) as well as in Bulgaria (see Table 1). Compared to Southern Europe, the drop in fertility rates in the late-1960s and early 1970s cohorts was generally smaller in the Central and Eastern European countries (Frejka and Calot 2001). With regard to childlessness intentions, we refer to the prevalent social norms (see Table 1). Indeed, previous studies revealed a clear East–West divide in the cultural acceptance of childlessness, with Eastern European populations clearly opposing childlessness (Merz and Liefbroer 2012).

We examine three explanations for variations in the actual number of children: economic situation, work–family combination, and unplanned births. Past studies confirmed that economic conditions are central for men's and women's fertility behaviors. A negative correlation between the unemployment rate and the total fertility rate has been documented (D'Addio and Mira d'Ercole 2005) and individual-level research showed that unemployment may lead couples to delay or forgo childbearing (Adserà 2011; Kreyenfeld and Andersson 2014). In 1995–2004, Western Europe and the US were least affected by unemployment, although the unemployment levels were substantial in France, Belgium, and Germany (see Table 1). The unemployment rate was particularly high in some Southern European countries (notably in Spain and Italy) and in most of the East, particularly in Bulgaria and the Baltic states, which was linked to a post-1989 economic depression.

Second, work–family compatibility is another important factor affecting fertility levels. There are several possible indicators to measure the conditions of work–family reconciliation. In terms of family policies, childcare services and childcare leaves are two key instruments (Matysiak and Węziak-Białowolska 2016), and we focus here on childcare services.[4] In addition, we present the employment rate of mothers with children below age 15 as a measure of the outcome of work–family conditions (Table 1). Well-paid parental leave of moderate length and a well-developed childcare infrastructure strengthen women's ties to the labor market (Dearing 2016) and are related to higher fertility rates (Luci-Greulich and Thévenon 2013). There is also a positive correlation between the female labor force participation rate and

[4] We have opted to present indicators related to childcare services, which are well comparable across countries, while the details of childcare leaves (availability, duration, financial compensation) are frequently complex. We first include the enrolment rate in formal childcare for children below the age of three. Childcare provision lowers the barriers of mothers to enter employment and encourages them to take a break of short to moderate length. Second, we include the average number of weekly hours in childcare for the same age group, which reflects whether mothers can work full-time or part-time.

the fertility rate (Ahn and Mira 2002; Engelhardt et al. 2004). As shown in Table 1, mothers' employment rates are particularly low in the Southern European countries (with the exception of Portugal), which are characterized by weak family support policies, e.g., low childcare participation and low availability of part-time work (Adserà 2004, 2005; Del Boca et al. 2009). Several Central and Eastern European countries report low employment rates for mothers (especially Hungary) and often low enrolment rates for children below age three (the Czech Republic, Bulgaria, and Hungary). In some of these countries—particularly in the Czech Republic and Hungary—mothers take rather long leaves after childbirth (OECD 2017). The Central and Eastern European countries are similar to the South of Europe in their labor market structures (full-time work, high unemployment), but have higher public spending on family benefits (OECD 2014). After the regime change (when the women were surveyed), there was a rapid and dynamic societal transformation which included labor market reforms, social benefits, and family policies (Frejka and Gietel-Basten 2016). In Germany and Austria, mothers' labor force participation rates are comparatively high while childcare enrolment rates of children below age three are very low: mothers commonly take long employment breaks after the birth of a child and tend to return to the workplace on a part-time basis (Berghammer 2014; Konietzka and Kreyenfeld 2010). Switzerland differs in that early childcare enrolment is frequent, but kindergarten opening hours are very short. In the UK and The Netherlands, women tend to re-enter the labor market rather fast after the birth of a child, mostly on a part-time basis. In the other countries, including France, Belgium, the US, and the Nordic countries, childcare enrolment rates are high and women combine full-time employment with childrearing duties.

Third, we refer to the prevalence of unplanned births due to contraceptive failure and restricted access to abortion. A high prevalence of unplanned and unwanted births is expected to reduce the gap between intentions and realized fertility. While variation in the rate of contraceptive use was modest across countries in the 1990s (when the women in our sample were generally between 20 and 29 years old), there were major differences with regard to the reliability of the contraceptive methods used (Makay 2015). Couples in Western European countries and several more affluent countries of Central and Eastern Europe used highly effective means of contraception (pill, IUD, and condom), while less reliable methods (rhythm and coitus interruptus) were more widespread in less prosperous and more Catholic Central and Eastern European countries (see Table 1). Slovakia, Lithuania, and Bulgaria report the lowest use of effective contraception; in the first two countries, this is related to the Catholic Church's opposition to artificial methods of contraception (Stloukal 1999) and in Bulgaria to the high costs of access (Vassilev 1999). In Bulgaria and elsewhere across the Central and Eastern European region, the low prevalence and limited supply of effective contraception were partly compensated for by resorting to abortion; rates of legally induced abortion were overall much higher in the East than in the West of Europe (Table 1). In Italy and Greece, though contraception was used, effective contraception was used less frequently than in most other Western European countries.

In conclusion, based on these dimensions, we formulate the following country- and region-specific expectations.

Southern Europe

We expect comparatively high fertility intentions, particularly in Spain and Portugal, where the mean family sizes of the parents' cohorts were among the largest in Europe. Large fertility gaps and excess childlessness are predicted for Italy, Spain, and Greece (but less so for Portugal where mothers' employment rate is much higher) for reasons of difficult labor market conditions and low support for reconciling work and family life. The share of unplanned births could be higher in Italy and Greece where the use of reliable contraception is low.

Central and Eastern Europe

We observe two groups of countries: the less economically advanced in the 1990s, with a poor economic and labor market situation and low use of reliable contraception (Bulgaria, Lithuania, and Latvia); and more affluent countries with higher use of contraception (the Czech Republic, Estonia, Hungary, and Slovenia). Childcare services for small children are infrequently used in comparison with the West, but mothers' labor market participation is at equivalent levels. Given that the drop in fertility since the respondent's childhood was not steep in most countries and that unplanned births might play a role in several countries, we expect overall lower fertility gaps than in the South or German-speaking countries. In addition, we anticipate particularly low childlessness intentions and actual childlessness (i.e., a small gap) across Central and Eastern Europe based on social norms disapproving of childlessness.

Western Europe and the United States

Based on economic circumstances, work–family policies, reliability of contraception, and modest downward trends in fertility, Belgium, France, Netherlands, Norway, the UK, and the US are expected to display a moderate gap in both number of children and level of childlessness. Germany, Austria, and Switzerland are characterized by weak support of work–family reconciliation, which is why we expect lower fertility, but at the same time lower intentions—given their long-term history of low fertility—and thus a moderate gap as well.

Education-Specific Expectations

Our study also examines the variation in the fertility gap between women with different levels of education between ages 25 and 29. Due to data constraints, we perform the education-specific analysis for a subset of 11 countries only: Southern Europe

(Italy, Spain), Western Europe (Austria, Germany, Belgium, the UK, The Netherlands, Norway, Switzerland) and the US, Central and Eastern Europe (Czech Republic, Hungary). Prior research found no clear education gradient in lifetime fertility intentions (Berrington and Pattaro 2014; Sobotka 2009; Testa 2014), so we base our expectations about the magnitude of the fertility gap by education on the differentiated constraints to actual fertility by education. Besides possible differences in unplanned births, we consider education-specific labor market opportunities linked to the economic situation and opportunities for combining work and family.

The educational gradient in mothers' employment rates is particularly large in Italy, Spain, Belgium, the US, and The Netherlands, while it is smallest in Norway and Switzerland (see Table 2). Unemployment rates differ most strongly by education in the Czech Republic, Hungary, Germany, Belgium, and France, while they are most comparable in Norway, Switzerland, Austria, The Netherlands, and Italy. Poor support for combining work and family responsibilities tends to curtail fertility of highly educated women most strongly. Hence, we expect a smaller educational gradient in final parity in countries which support work–family reconciliation (see Table 1 for childcare indicators).

Based on these factors, we formulate the following expectations.

Southern Europe

Moderate variations by level of education in fertility gap and excess childlessness are expected in Italy and Spain, where, on the one hand, highly educated women participate in the labor market but receive limited support for work–family reconciliation, and where, on the other hand, families with less education face high work insecurity (particularly in Spain). These mechanisms could curtail the number of children in both groups, although for different reasons.

Western Europe and the United States

Among these countries, we expect the smallest gap in fertility and childlessness in Norway, where labor market behavior and unemployment risks are the most similar across educational groups and work–family policies support mothers' employment. Moreover, we expect that the fertility gap by education and the gradient in excess childlessness is more pronounced in Austria, Germany, and Switzerland compared to in Belgium and The Netherlands, because women participate in the labor market but family policies are not geared towards the combination of work and family. Given the strong educational differences in fertility in the UK and the US (Berrington et al. 2015), which are predominantly driven by high teenage fertility and unplanned births among the less educated (Morgan and Rackin 2010; Musick et al. 2009), we also expect women with lower levels of education to display a smaller fertility gap than their higher educated peers.

Table 2 Country characteristics by education

	Age at completing education (1)				Employment rate of mothers age 25–44 with children < 15 years (2)								Total unemployment rate, age 25–49 (3)							
	1990–1999				1995–1999				2000–2004				1995–1999				2000–2004			
Age of study population	25–29				20–29				25–34				20–29				25–34			
	L	M	H	Diff.	L	M	H	Diff.	L	M	H	Diff.	L	M	H	Diff.	L	M	H	Diff.
Western and Northern Europe																				
Belgium	16	18	21	5	46	69	84	38	45	69	83	38	14	8	4	11	11	6	3	8
France	17	19	23	6	52	68	77	25	50	68	76	26	16	10	7	10	13	7	6	8
The Netherlands	–	–	–	–	52	73	85	33	52	71	78	26	7	4	3	4	4	2	2	2
Norway	16	18	21	5	63	75	80	17	61	75	78	17	4	3	2	2	5	3	3	2
UK	17	19	22	5	58	71	82	24	53	68	75	22	9	6	3	6	7	4	2	5
US	–	–	–	–	–	–	–	–	–	–	–	–	10	5	3	7	8	4	2	6
German-speaking countries																				
Austria	–	–	–	–	59	69	79	20	54	66	73	19	8	4	3	5	8	4	2	6
Germany	–	–	–	–	48	65	77	29	42	59	69	27	15	8	5	10	16	8	4	12
Switzerland	16	19	23	7	65	74	80	15	67	76	83	16	7	3	3	4	6	3	2	4
Southern Europe																				
Italy	15	20	25	10	35	59	74	39	34	58	74	40	11	9	8	3	10	7	7	3
Spain	16	19	23	7	34	50	65	31	38	54	69	31	21	17	14	6	13	10	8	4

Table 2 (continued)

	Age at completing education (1)				Employment rate of mothers age 25–44 with children < 15 years (2)								Total unemployment rate, age 25–49 (3)							
	1990–1999				1995–1999				2000–2004				1995–1999				2000–2004			
Age of study population	25–29				20–29				25–34				20–29				25–34			
	L	M	H	Diff.	L	M	H	Diff.	L	M	H	Diff.	L	M	H	Diff.	L	M	H	Diff.
Central and Eastern Europe																				
Czech Republic	17	18	22	5	49	64	70	21	42	61	68	26	19	6	2	16	23	6	2	21
Hungary	16	18	21	5	45	65	78	33	37	60	70	33	15	7	2	13	13	5	1	11

Sources (1) Own computations based on the Fertility and Family Surveys 1990–1999 and for the UK on the General Household Survey 1989–1991. (2) Own computations based on the EU Labour Force Surveys. Mothers on maternity leave or parental leave are coded as non-employed. Country deviations: 1996–1999 (CH), 1997–1999 (CZ, HU). (3) Eurostat Database: unemployment rates by sex, age, and educational attainment level (%) (lfsa_urgaed). Country deviations: 1996–1999 (CH, NL, NO), 1997–1999 (HU), 1998–1999 (CZ). US: unemployment rates of persons 25 to 64 years old, refers to 1995 and 2000 (National Center for Education Statistics, Table 501.80: unemployment rates of persons 16 to 64 years old, by age group and highest level of educational attainment: selected years, 1975 through 2015); education definition: low (less than high school completion)/medium (high school completion)/high (bachelor's or higher degree)

A dash indicates that no data are available

Central and Eastern Europe

The Czech Republic is characterized by very high unemployment among the low-educated and a rather high female labor force participation rate, although parental leave policies enacted in the early 1990s motivated mothers to stay home with their children. This country has generous universal social benefits, which could result in a lower educational gradient than in the rest of the region (Brzozowska 2015). Hungary implemented policies in the early 1990s that encouraged women to leave their employment in order to relieve the labor market (Brzozowska 2015; David 1999). These policies suggest that highly educated women could have fewer children overall and a high level of childlessness, discouraged by the difficulty of reconciling a career with childrearing.

Data and Methods

In our study, we compare fertility intentions reported by 20- to 24-year-old women born between 1965 and 1979 (with the majority born between 1970 and 1975) to completed fertility at age 40 in the same birth cohorts. For the education-specific analysis, we focus on the 25 to 29 age range because most will have completed their education (see Table 2 for age at completion of full-time education). At this age, women still have a relatively long timeline to fulfill their reproductive plans, although in some subgroups (especially among the less educated) a large proportion of women have initiated childbearing in their early 20s, and could already have reached their completed fertility (Rendall et al. 2010; Rendall and Smallwood 2003).[5] In a sensitivity analysis, we found that the country ordering for the fertility gaps were consistent for the 20 to 24 and 25 to 29 age groups, so the patterns were not very sensitive to the specific age range. We could not disaggregate by education, given that fertility data by level of education are not yet available for these later birth cohorts.

The Fertility and Family Surveys (FFSs) were our main data source on fertility intentions. Table 3 provides the survey characteristics (for more details, see Prioux and Festy 2002). The FFS were conducted during the 1990s under the leadership of the United Nations Economic Commission for Europe. The exact cohorts studied depended on the survey year. In most countries, these surveys cover men and women between ages 20 and 49, interviewed face to face. Compared to the Eurobarometer surveys, which also contain questions on lifetime intentions, the large sample sizes are a clear advantage of the FFS. Another advantage is that—unlike its successor, the Generations and Gender Surveys—lifetime intentions questions are identical

[5] Although birth schedules are influenced by the duration of education (i.e., childbearing is generally postponed until education is completed), there is little evidence so far that the length of education itself substantially affects completed fertility and childlessness (Monstad et al. 2008; Skirbekk et al. 2004). Events that take place after the end of the studies (in particular related to partnership and employment) seem much more likely to be responsible for further postponement and lead, in consequence, to a lower number of children.

across country questionnaires (Beaujouan 2013). In the FFS, the question wording was "(In addition to the child you are now expecting [pregnant]) do you want to have (children of your own [childless]) (another child [parous]) some time? Yes, no, don't know," followed for those who indicated yes by the question, "(In addition to the child you are now expecting [pregnant]) how many (children of your own [childless]) (more children [parous]) do you want?" The share of 'don't know/missing' answers to the first question is provided in Table 3; a distinction between 'don't know' and missing for other reasons was not possible to know in several surveys. For that reason, we could not assess the link between the prevalence of uncertainty and the size of the gap. If in the first question women responded that they wanted a child, but did not give a number in the second question (this concerned between 0 and 4%; Bulgaria was distinct because 13% were missing), we imputed the number of children intended based on valid cases in the country, controlling for age, parity, marital status, and level of education.[6] For two countries we used different datasets: for The Netherlands, we used the Onderzoek Gezinsvorming (OG, Survey of Family Formation) data of 1998 (de Graaf and van Duin 2007), and for the UK, the CPC General Household Survey (GHS) time series of 1989–1990 (Beaujouan et al. 2011, 2014, 2015), which contain relatively comparable questions on fertility intentions and identical response categories (yes, no, don't know).[7]

In order to compare the lifetime fertility intentions of women aged 20 to 24 with the completed number of children, we used fertility estimates at the end of the reproductive life for the same (or approximatively the same) cohorts. Completed cohort fertility and childlessness levels were either reconstructed from the Human Fertility Database (Human Fertility Database 2016; Jasilioniene et al. 2007), from data by national statistical offices, or provided by Tomáš Sobotka (Sobotka 2017; Sobotka et al. 2015) (for further details see Table 4). Unfortunately, cohort childlessness was not available for Portugal, so this country can only be included in the analysis of completed fertility but not of childlessness. All analyses were restricted to women because completed cohort fertility was mostly unavailable for men.

The substantial sample sizes of the FFS (more than 500 women 25 to 29 years old in most surveys) enabled us to categorize observations into three different educational groups (see Table 4 for sample sizes and data sources). We excluded Lithuania because the education categories could not be reconciled with the ISCED classification. Data for completed fertility and cohort total childlessness by level of education were not available in a few other countries. Data on

[6] This way, we avoided an underestimation of the number of children intended due to the exclusion of women with positive intentions but missing information on the number. Possibly, women with missing information on this item intend a lower number of children than those with valid information. If this is the case, the imputation can bias estimates of the intended number of children very slightly upwards.

[7] In OG, "Do you still expect (more [parous]) children in the future (other than this child [pregnant])?" *Yes, don't know, no;* If "Yes" or "Don't know", "How many children do you expect at least? And how many at most?". In the GHS, "Do you think that you will have any (more [parous]) children at all (after the one you are expecting [pregnant])?" *Yes, no, don't know;* If "Yes" or "Don't know", "How many children do you think you will have born to you in all (including those you have already [parous]) (who are still alive) (and the one you are expecting [pregnant])?".

Table 3 Main characteristics of the Fertility and Family Surveys

Countries	Survey years	Original sample size (women)	Survey non-response rate (women)	Proportion missing/don't know fertility intentions[f]	Cohorts surveyed at age 20–24	Final sample size, women age 20–24 at time of survey
Austria	1995–1996	4581	33/18[a]	7	1971–1976	675
Belgium	1991–1992	3236	30	5[e]	1967–1972	599
Bulgaria	1997–1998	2367	9[b]	21	1973–1978	306
Czech Republic	1997	1735	7[b]	17	1973–1977	266
Estonia	1994	5021	15	1	1970–1974	299
France	1994	2944	16	8	1970–1974	450
Germany	1992	5976	24/29[c]	27	1968–1972	1041
Greece	1999	3031	84[d]	6	1975–1979	496
Hungary	1992–1993	3554	12	14	1968–1973	678
Italy	1995–1996	4824	42	10	1971–1976	840
Latvia	1995	2699	23	26	1971–1975	347
Lithuania	1994–1995	4516	29	21	1970–1975	406
The Netherlands[g]	1993	4516	10	6	1969–1973	763
Norway	1988–1989	4019	19	22	1964–1969	605
Portugal	1997	5954	5	9	1973–1977	911
Slovenia	1994–1995	2798	14[b]	13	1970–1975	333
Spain	1994–1995	4021	16	14	1970–1976	624
Switzerland	1994–1995	3878	62[d]	17	1970–1977	304
UK[h]	1989–1990	14,004	n.a.	9	1965–1969	1215
US	1995	10,847	n.a.	12	1971–1975	1416

Table 2 (continued)

[a]Non-response rate of men and women was 33% in Vienna and 18% in the rest of Austria

[b]Men and women

[c]East and West Germany

[d]The response rates in Greece and Switzerland are based on a different calculation and probably overestimated. Their statistical offices suggest that, after weighting, the representativeness of the samples remains reasonable (Prioux and Festy 2002)

[e]In Belgium, the proportion intending to remain childless was very high at age 20–24 (17%) for an unknown reason. We decided not to display the results for this age group, but display them by level of education for the 25–29 age group

[f]We excluded countries with very high shares of missing values and/or don't know answers (more than 30%), namely Canada, Finland, and New Zealand, because such high levels could reflect a structural problem in the survey (e.g., some respondents were not asked the question). In Poland, the proportion missing at age 20–24 was particularly high (37%) as was the share of missing values on number intended when answering yes (22%) so Poland was excluded as well

[g]Onderzoek Gezinsvorming

[h]CPC General Household Survey time series

Table 4 Sample sizes by education and data sources for completed fertility by level of education

Countries	Final sample size, women age 25–29 at time of survey, by education			Data source for completed fertility by level of education
	Low	Medium	High	
Austria	211	420	155	Microcensus 2012
Belgium	186	339	359	Extrapolation 2001 census
Czech Republic	137	141	34	Census 2011
Germany	356	831	292	Microcensus 2012
UK	981	267	133	GHS + Understanding Society 2009
Hungary	323	265	112	Census 2011
Italy	304	477	96	Famiglia e Sogetti Sociali 2009
The Netherlands	269	431	161	Onderzoek Gezinsvorming 2008
Norway	89	212	415	Generations and Gender Survey 2007–2008
Spain	394	153	164	Census 2011
Switzerland	64	498	97	Swiss Household Panel 2013
US	325	571	843	Current Population Survey 2008/2010/2012

final parity were either provided in the Cohort Fertility and Education Database (Zeman et al. 2014), or recalculated based on the Generations and Gender Surveys that took place in the early 2000s. We used the common classification of educational levels into low (ISCED 0–2; up to lower secondary), medium (ISCED 3–4; upper secondary and post-secondary non-tertiary), and high (ISCED 5–6; tertiary). Since information on the level of education pertains to the time of the interview, we had to make the assumption that, in the cohorts studied, education was stable over time, from their mid- to late 20s.

Our analytical approach is as follows: we undertake a side-by-side comparison of different countries for which we provide information on the macro-context, without testing contextual variables in macro-level models. This approach is widely used, but mostly—although not exclusively—for a smaller number of countries (Yu 2015). We settled on this approach because of the lack of contextual data and information on the years of giving birth for a time span of around 20 years (from young adulthood to the early 40s) and for 20 countries: too many data points were missing to estimate macro-level models.

Our research design has several limitations. First, an aggregate approach naturally precludes any statements about the realization of intentions on an individual level. Because we do not follow individuals over time, we cannot know the extent to which women over- or under-achieve their fertility intentions and how this differs across countries. Second, it may be considered a drawback that the cohort fertility gap is only measured after a cohort has completed its fertility (that is, after an approximately 20-year period of childbearing), incurring a long lead time. This is different from period measures which are available for recent periods. Third, some researchers have critically noted that lifetime fertility intentions are difficult to measure. Respondents do not necessarily have an attitude formed at the time of the interview

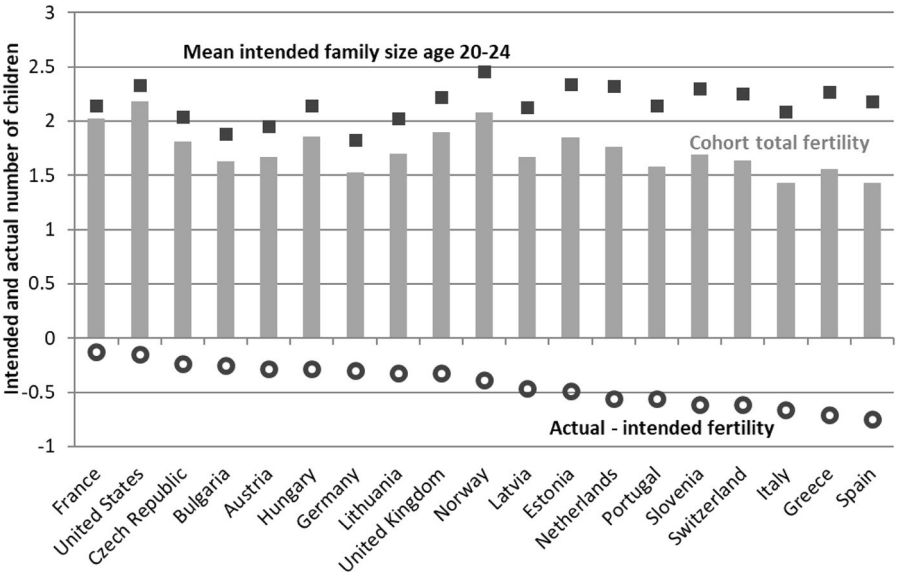

Fig. 1 Mean intended family size at age 20–24, completed cohort fertility rate at age 40–42, and fertility gap. *Sources* for intentions: Fertility and Family Surveys, Onderzoek Gezinsvorming, CPC General Household Survey time series; for cohort total fertility: Human Fertility Database, national statistical offices or provided by Tomáš Sobotka. Interpretation: in Austria, women born in the early 1970s intended to have 1.95 children but only had 1.67 on average. Actual family size was thus lower than intended family size by 0.28 children on average, so the size of the gap was 0.28 children per woman

(Bachrach and Morgan 2013) and possibly make up whether they want children or not, as well as how many, because of the coercive nature of the interview situation and possibly influenced by social norms and desirability (Ní Bhrolcháin and Beaujouan 2019). Fourth, it is a general concern in cross-national research that deviations in question wording, differences in survey protocols (e.g., representativeness of the samples), and in survey quality (e.g., high non-response rates) may affect the results (Beaujouan 2013).

Results

We first show the findings for the fertility gap and for excess childlessness across countries and then analyze fertility gap and excess childlessness by education. Figure 1 depicts the mean intended family size between ages 20 and 24, the completed cohort fertility rate at age 40 in the equivalent birth cohorts and the difference between both measures. The difference is negative for all countries, because completed fertility was always below the mean intended family size measured in young adulthood. A distinct cluster appears for the Southern European countries, where the size of the fertility gap is largest (slightly less so in Portugal). This is driven by a combination of relatively high fertility intentions at younger ages and below-average mean numbers of children. In Central and Eastern Europe, we

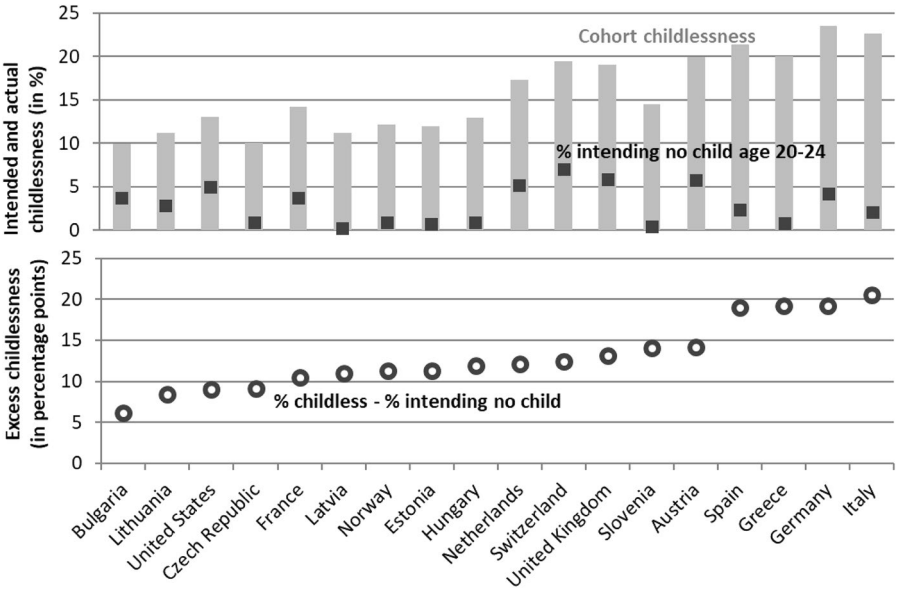

Fig. 2 Share of women intending not to have children at age 20–24, share not having children at age 40–42, and excess childlessness. *Sources* like in Fig. 1; in Bulgaria, the Czech Republic and Greece levels of childlessness were extrapolated based on the existing data. Interpretation: in Austria, 5.8% of women born in the early 1970s intended to remain childless, but on average 19.9% remained childless. The share of women eventually childless was thus larger than the share originally intending not to have children, exceeding it by 14.1 percentage points

find a larger gap in countries with a poorer economic situation, particularly in the Baltic States but, deviating from this rule, also in Slovenia. The Czech Republic and Hungary, on the other hand, display a smaller fertility gap. As expected, Austria and Germany, where both intentions and completed fertility are low, display moderate fertility gaps. Conversely, in Switzerland, intentions are much higher than expected based on the low fertility of the previous cohorts, and consequently the gap is very wide. In the other Western countries, the largest gaps are observed in The Netherlands and Norway, which are among the countries with the highest mean intended family size (resp. 2.32 and 2.46). The size of the gap is explained by high levels of intentions rather than by low fertility levels. The gap is relatively small in the UK, the US, and France.

Excess childlessness clearly differs between European regions (Fig. 2). In particular, childlessness intentions are almost non-existent in the Central and Eastern European countries and a low level of around 10–12% of women have remained childless, so excess childlessness is below 11 percentage points (again, except for in Slovenia where childlessness reaches almost 15%). Intentions are also quite low in France, Norway, and the US and less than 15% of women remain childless, hence their balance is the closest to the Central and Eastern European countries. At the other end of the spectrum, despite a low preference for staying childless, a significant share of women in Spain and Italy will eventually not have any

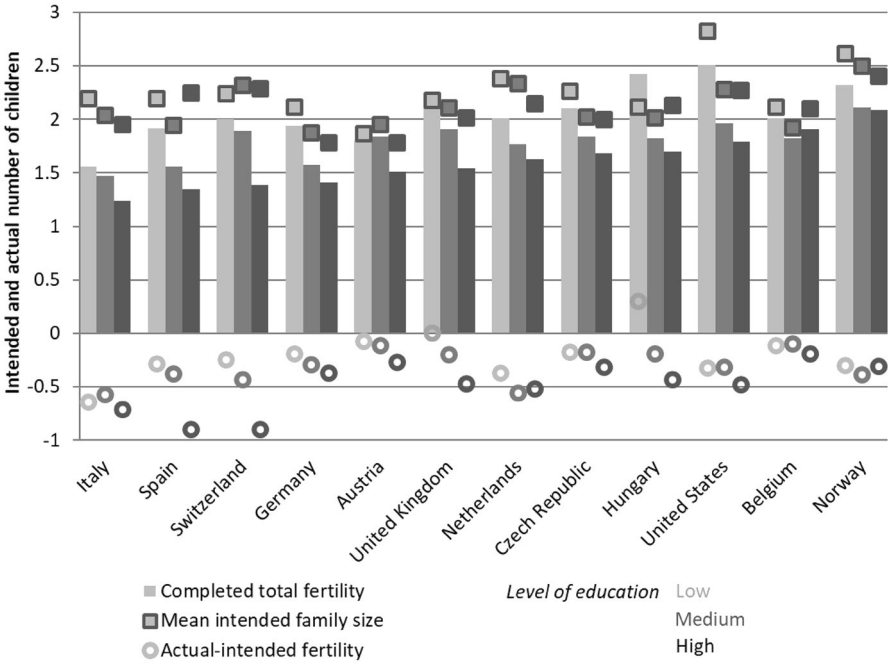

Fig. 3 Mean intended family size at age 25–29, completed cohort fertility rate at age 40–42, and fertility gap by level of education. *Sources* like in Fig. 1

children (around 22%), resulting in the largest excess childlessness in Europe (around 20 percentage points). Other Western European countries display both higher childlessness intentions and high rates of childlessness—typically around 20%—so that the discrepancy is between 12 and 14 percentage points.

Having discussed family size and childlessness for all women, we now turn to education-specific findings. Figure 3 compares the intended and actual mean number of children by level of education. Intended family size between ages 25 and 29 is higher than completed fertility after age 40 in all analyzed countries and education groups. There is no consistent educational gradient in mean intended family size, although for most countries it is either U-shaped or negative. However, the educational gradient in completed fertility is clearly negative, and highly educated women generally show the largest gap between intended and realized fertility. The educational gradient is, however, small in several countries: the gap amounts to around 0.6–0.7 children per woman in all educational groups in Italy, around 0.4–0.5 in The Netherlands and the US, and is lower than 0.3 in the Czech Republic, Norway, Germany, and Austria. This is either due to similarly large gradients in intentions and fertility (e.g., in the US) or to small gradients in both (e.g., in Norway). By contrast, the difference between low and highly educated

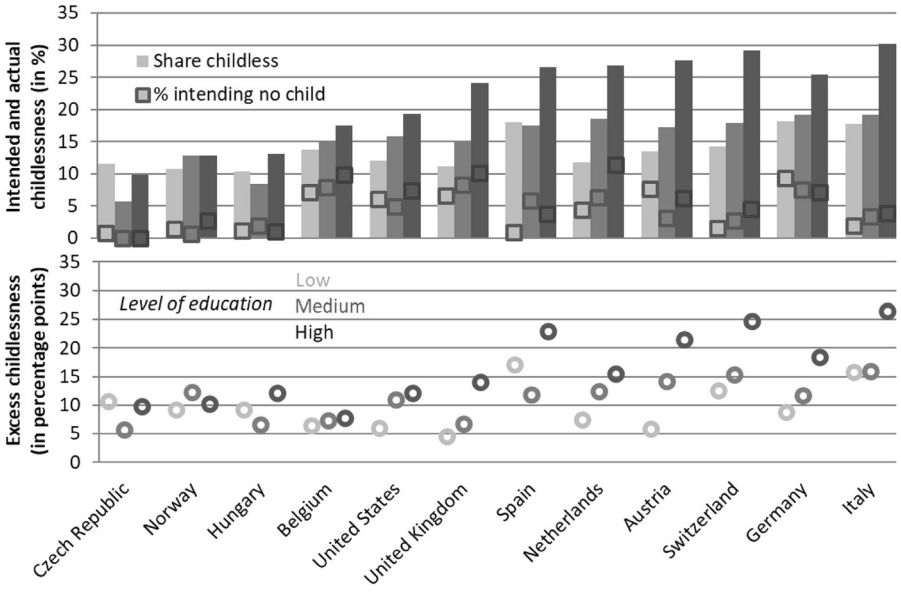

Fig. 4 Share of women intending not to have children at age 25–29, share not having children at age 40–42, and excess childlessness by level of education. *Sources* like in Fig. 1

women in the intentions-fertility gap is by far largest in Spain and Switzerland (around 0.6 children per woman, with the gap amounting to 0.9 children among highly educated women, and to 0.3 children among the less educated) and in both countries the gap is driven by the steep educational gradient in completed fertility while fertility intentions by educational attainment are less varied. Overall, the size of the educational gradient in the gap between intended and realized fertility across countries shows contrasting patterns, which do not seem to depend on economic criteria or regional specificity. This is both because of the variability in educational differences in intentions and the very diverse completed fertility gradients within regions with similar characteristics.

Finally, Fig. 4 summarizes the results for childlessness by level of education. Unlike mean family size, which did not show a regional pattern, the Southern European and the German-speaking countries clearly exhibit the largest difference in excess childlessness between low and highly educated women. The two Central and Eastern European countries (Czech Republic and Hungary), as well as Norway and Belgium, display almost no educational gradient in excess childlessness, having rather uniform intentions and actual levels by educational attainment. In the countries that exhibit a large gradient, it is almost entirely driven by the strong educational differences in actual childlessness. And clearly, with the exception of Central and Eastern Europe, this gradient is the highest in countries where reconciling a career with children is most difficult, i.e., in Spain and Italy and the German-speaking countries.

Concluding Discussion

Our exploration of the aggregate gap between fertility and childlessness intentions in young adulthood and completed family size and final childlessness in the same birth cohorts brings new insights to the discussion on the "fertility gap." Inspired by Bachrach and Morgan's approach (2013), we took the perspective that intentions at young ages were defined by societal fertility norms and family context, and that institutional conditions in peak childbearing years have a large impact on the capacity to meet fertility goals. Our comparative approach allowed us to suggest explanations to why the size of the fertility gap differs across countries and educational groups.

Our results reveal quite distinctive regional patterns for women born (mostly) in the early 1970s. We observe the largest fertility gaps in the Southern European countries (more than 0.6 children per woman in Italy, Greece, and Spain). This is in line with our expectations: we anticipated low completed fertility in the South based on unstable labor market conditions and little support for reconciling work and family life. In these countries, the fertility gap was boosted by the relatively high fertility intentions in young adulthood, certainly driven by traditionally large family sizes. For Central and Eastern European countries, we identified countervailing forces that might influence the fertility gap: poor economic situations and difficulty combining work and family (both being conducive to a small family size), partly counterbalanced by a high prevalence of unplanned births. The intended family size was rather low in that region (around two children per woman in most countries), corresponding to relatively low fertility achieved in the parental cohort. Although we found rather small gaps in most Central and Eastern European countries, in line with our expectations, higher fertility gaps of 0.3–0.4 children per woman were displayed in the region's weaker economies (particularly the Baltic States). Among the Western countries, in the UK, the US, and France, rather high fertility together with higher fertility intentions (in line with previous cohorts' fertility levels) resulted in a small to medium gap. It may seem surprising that both France and the US have the smallest gaps between mean intended and total fertility, because France has more developed and generous family policies than the US (Crittenden 2001). However, the high share of "overachievers" in the US (e.g., teenage mothers) may be responsible for this finding (Berrington and Pattaro 2014; Morgan and Rackin 2010; Quesnel-Vallée and Morgan 2003). In the German-speaking countries, we would have expected larger gaps because the support for work–family reconciliation is weak, but we found that this larger gap only applies to Switzerland. Indeed, Germany and Austria are among the countries with the lowest mean intended family sizes, in line with their long history of low fertility, which resulted in moderate gaps. Switzerland, however, had persistently high fertility intentions, despite its long-term low fertility.

How do these results compare to previous research? Studies on the UK and the US have indicated fertility gaps of a magnitude of 0.2–0.3 children per woman for slightly older cohorts than studied here (Morgan and Rackin 2010; Smallwood and Jefferies 2003). Comparing all the countries studied, these gaps are relatively moderate and, depending on the region, they may be significantly higher: fertility

gaps are, for instance, about twice as large in the Southern European countries. Based on the intended number of children and the tempo-adjusted total fertility rate, gaps of around 0.3–0.4 children per woman had been reported as a European average which closely correspond to the mean of all the countries we included (Sobotka and Lutz 2010). However, the regional pattern obtained with the tempo-adjusted method clearly diverged from ours as moderate gaps were noted for Southern Europe and large gaps for Central and Eastern Europe (Sobotka and Lutz 2010).

In addition to the mean number of children, we presented evidence on childlessness. The assumption that both childlessness intentions and actual childlessness would be particularly low in the Central and Eastern European countries (resulting in a small gap) was confirmed by our results. Indeed, the cohorts under study grew up under state socialism (until their late teenage years), when there were very strong norms against voluntary childlessness and policies supporting early and almost universal entry into parenthood. In this context, women would have one child rather than none (Frejka and Gietel-Basten 2016; Merz and Liefbroer 2012; Sobotka 2011).[8] Very low childlessness levels continued long after the fall of communism (Beaujouan et al. 2016). Our results suggest that in the East, the strong negative attitudes towards childlessness were more important for defining intentions and actual fertility than the economic situation or family policies. In addition, we identified two distinct country clusters that featured the largest excess childlessness of around 20%: the Southern European countries (Italy, Greece, and Spain) and the German-speaking countries (particularly Germany and Austria). Excess childlessness was lower (above 10 percentage points) in the other Western countries, where it may have been mitigated by the well-established work–family policies.

The education-specific analyses refined some of our general results. In accordance with prior research, we observed small differences in fertility and childlessness intentions by education, without a clear-cut pattern (Testa 2014). However, our analysis confirmed that highly educated women achieve a lower mean number of children (except for in Belgium and Norway) and a higher level of childlessness (except for in the Czech Republic and Norway), which leads to a larger gap between intentions and final parity than for their lower educated counterparts. Overall, the size of the educational gradient of the gap in mean family size did not seem predicted by economic criteria or welfare regimes. For instance, we had expected moderate education-based gradients in Italy and Spain because childbearing of the low educated is curtailed by high economic insecurity, while childbearing of the highly educated is constrained especially by limited support for combining employment and family. This seemed to apply only to Italy, whereas in Spain, the fertility gap was much larger for highly educated women. In the UK, we observed almost no fertility gap among less educated women, but a marked gap among their highly educated peers, which was in line with previous findings in the UK and the US (Berrington and Pattaro 2014; Morgan and Rackin 2010; Quesnel-Vallée and Morgan 2003). Unintended

[8] In addition, in face-to-face interviews, the answers on childlessness intentions may have been particularly low because they partly reflected social desirability.

fertility among the less educated women, linked to low contraceptive use and high rates of teenage pregnancies, could partly explain this result. We did not find that result for women in the US, but the differences with previous research in age group, birth cohort, and measurement may be behind this discordance.

Unlike for the mean number of children, the educational gradient for excess childlessness displayed a clear regional pattern: the gradient was the largest in countries where the combination of work and family is most difficult, namely the German-speaking countries and Southern Europe, as well as in The Netherlands and the UK where the majority of mothers work part-time. We had expected the smallest gradient in Norway given the well-established work–family policies and similar labor market outcomes between educational groups. This is confirmed by our data: the educational gradient in final childlessness is the lowest of all the countries studied together with Belgium. In contrast, in Hungary and the Czech Republic, childlessness levels were close to initial childlessness intentions, and particularly so among the medium educated.

What do our findings suggest in terms of policies? One of the clearest results is that highly educated women have the highest level of excess childlessness (18–26 percentage points) in the German-speaking (Austria, Germany, Switzerland) and the Southern European countries (Italy, Spain), where the obstacles for work–family reconciliation are highest. We could show that, despite highly educated women having moderately stronger preferences for work than their lower educated peers (Hakim 2002), they are not more likely to want to stay childless or to want fewer children than lower educated women. Still, fertility gap and excess childlessness are highest for them in almost all countries. The larger gaps among more highly educated women suggest that focusing policies on the needs of higher educated women to reconcile work and family demands are likely to have the biggest influence on birth rates. A series of measures have been suggested that aim to provide highly educated women with good conditions for having the number of children they want to have and a career simultaneously. This would include a well-developed childcare system when it comes to opening times and quality, a short to medium period of parental leave of up to 1 year with income-based payments available for all types of job, e.g., self-employed (Dearing 2016), and flexibility in terms of time and place to work. In addition, Esping-Andersen has argued that "a return to fertility levels that are more aligned with people's preferences will require the consolidation of a new, 'gender egalitarian' family equilibrium" (Esping-Andersen 2017, p. 56). Highly educated couples generally display more gender egalitarian attitudes and are hence particularly inclined to respond to policies aimed at gender equality. Examples of such policies are reserving part of parental leave for fathers (Dearing 2016) and taking into account fathers' care responsibilities in employment policies (e.g., flexibility, schedules that can be planned ahead, reducing overtime). In conclusion, if societies want to raise their birth rates, one pathway would be to enable highly educated women to have the children they intend to by fostering the combination of work–family for both mothers and fathers. An increase in fertility in gender egalitarian societies could thus be spearheaded by highly educated women (Esping-Andersen and Billari 2015).

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Affiliations

Eva Beaujouan[1] · **Caroline Berghammer**[2,3]

[1] Vienna University of Economics and Business (Demography group), Wittgenstein Centre for Demography and Global Human Capital (IIASA, VID/ÖAW, WU), Welthandelsplatz 2, Level 3, 1020 Vienna, Austria

[2] Vienna Institute of Demography/Austrian Academy of Sciences, Wittgenstein Centre for Demography and Global Human Capital (IIASA, VID/ÖAW, WU), Vienna, Austria

[3] Department of Sociology, University of Vienna, Vienna, Austria